

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. - 4808. (Canceled)

4809. (Original) A method for determining at least two properties of a specimen, comprising:

disposing the specimen upon a stage, wherein the stage is coupled to a measurement device, and wherein the measurement device comprises an illumination system and a detection system;

directing energy toward a surface of the specimen using the illumination system;

detecting energy propagating from the surface of the specimen using the detection system;

generating one or more output signals responsive to the detected energy; and

processing the one or more output signals to determine a first property and a second property of the specimen, wherein the first property comprises a presence of macro defects on the specimen, and wherein the second property comprises overlay misregistration of the specimen.

4810.- 4811. (Canceled)

4812. (Original) The method of claim 4809, further comprising laterally and rotatably moving the stage during said directing energy and said detecting energy.

4813.- 4816. (Canceled)

4817. (Original) The method of claim 4809, wherein the measurement device further comprises a non-imaging scatterometer.

4818. (Original) The method of claim 4809, wherein the measurement device further comprises a scatterometer.

4819. (Original) The method of claim 4809, wherein the measurement device further comprises a spectroscopic scatterometer.

4820. (Original) The method of claim 4809, wherein the measurement device further comprises a reflectometer.

4821. (Original) The method of claim 4809, wherein the measurement device further comprises a spectroscopic reflectometer.

4822. (Original) The method of claim 4809, wherein the measurement device further comprises an ellipsometer.

4823. (Original) The method of claim 4809, wherein the measurement device further comprises a spectroscopic ellipsometer.

4824. (Original) The method of claim 4809, wherein the measurement device further comprises a bright field imaging device.

4825. (Original) The method of claim 4809, wherein the measurement device further comprises a dark field imaging device.

4826. (Original) The method of claim 4809, wherein the measurement device further comprises a bright field and dark field imaging device.

4827. (Original) The method of claim 4809, wherein the measurement device further comprises a non-imaging bright field device.

4828. (Original) The method of claim 4809, wherein the measurement device further comprises a non-imaging dark field device.

4829. (Original) The method of claim 4809, wherein the measurement device further comprises a non-imaging bright field and dark field device.

4830. (Original) The method of claim 4809, wherein the measurement device further comprises a double dark field device.

4831. (Original) The method of claim 4809, wherein the measurement device further comprises a coherence probe microscope.

4832. (Original) The method of claim 4809, wherein the measurement device further comprises an interferometer.

4833. (Original) The method of claim 4809, wherein the measurement device further comprises an optical profilometer.

4834. (Original) The method of claim 4809, wherein the measurement device further comprises at least a first measurement device and a second measurement device, and wherein the first and second measurement devices are selected from the group consisting of a non-imaging scatterometer, a scatterometer, a spectroscopic scatterometer, a reflectometer, a spectroscopic reflectometer, an ellipsometer, a spectroscopic ellipsometer, a bright field imaging device, a dark field imaging device, a bright field and dark field imaging device, a non-imaging bright field device, a non-imaging dark field device, a non-imaging bright field and dark field device, a coherence probe microscope, an interferometer, and an optical profilometer.

4835. (Original) The method of claim 4809, wherein the measurement device further comprises at least a first measurement device and a second measurement device, and wherein optical elements of the first measurement device comprise optical elements of the second measurement device.

4836. (Original) The method of claim 4809, wherein the macro defects comprise resist contamination on a back side of the specimen.

4837. (Original) The method of claim 4809, further comprising processing the one or more output signals to determine a third property of the specimen, wherein the third property is selected from the group consisting of a roughness of the specimen, a roughness of a layer on the specimen, and a roughness of a feature on the specimen.

4838. (Original) The method of claim 4809, further comprising directing energy toward a bottom surface of the specimen and detecting energy propagating from the bottom surface of the specimen, wherein the first property further comprises a presence of macro defects on the bottom surface of the specimen.

4839. (Original) The method of claim 4809, wherein processing the one or more output signals to determine the first and second properties of the specimen comprises substantially simultaneously determining the first and second properties of the specimen.

4840. (Original) The method of claim 4809, further comprising directing energy toward multiple locations on the surface of the specimen substantially simultaneously and detecting energy propagating from the multiple locations substantially simultaneously such that one or more of the at least two properties of the specimen can be determined at the multiple locations substantially simultaneously.

4841. (Original) The method of claim 4809, wherein the stage and the measurement device are coupled to a process tool.

4842.- 4844. (Canceled)

4845. (Currently Amended) The method of claim 4809, wherein the stage and the measurement device are coupled to a lithography tool, the method further comprising determining the first property prior to an exposure step of ~~the a~~ lithography process and determining the second property subsequent to the exposure step of the lithography process.

4846. (Original) The method of claim 4809, wherein the stage and the measurement device are coupled to a lithography tool, the method further comprising determining the first and second properties subsequent to an exposure step of a lithography process.

4847. (Original) The method of claim 4809, wherein the stage and the measurement device are coupled to a process tool, wherein the process tool comprises a wafer handler, and wherein disposing the specimen upon the stage comprises moving the specimen from the process tool to the stage using the wafer handler.

4848. (Original) The method of claim 4809, wherein the stage and the measurement device are coupled to a process tool, the method further comprising moving the specimen to the process tool subsequent to said directing and said detecting using the stage.

4849. (Original) The method of claim 4809, wherein the stage and the measurement device are coupled to a process tool, the method further comprising determining at least the two properties of the specimen while the specimen is waiting between process steps.

4850.-4855. (Canceled)

4856. (Currently Amended) The method of claim 4809, wherein the stage ~~and the measurement device are disposed within a measurement chamber, wherein disposing the specimen upon the stage comprises disposing the specimen upon a support device disposed within a process chamber of a process tool, and wherein the support device is configured to support the specimen during a process step,~~ the method further comprising performing said directing and said detecting during the process step.

4857. (Canceled)

4858. (Currently Amended) The method of claim ~~4857~~4856, further comprising obtaining a signature characterizing the process step, wherein the signature comprises at least one singularity representative of an end of the process step.

4859. (Currently Amended) The method of claim ~~4857~~4856, further comprising altering ~~a parameter of one or more instruments~~ parameters of the process step coupled to the process tool in response to at least one of the ~~determined~~ first and second properties using an in situ control technique.

4860. (Original) The method of claim 4809, further comprising moving the specimen from a first process chamber to a second process chamber using the stage, wherein the first process chamber and the second process chamber are disposed within a process tool.

4861. (Original) The method of claim 4860, further comprising performing said directing and said detecting during said moving the specimen from the first process chamber to the second process chamber.

4862.-4864. (Canceled)

4865. (Currently Amended) The method of claim 4809, further comprising altering a sampling frequency of the measurement device in response to at least one of the ~~determined~~ first and second properties of the specimen.

4866. (Currently Amended) The method of claim 4809, further comprising altering a parameter of one or more instruments coupled to the measurement device in response to at least one of the ~~determined~~ first and second properties using a feedback control technique.

4867.-4868. (Canceled)

4869. (Currently Amended) The method of claim 4809, further comprising generating a database, wherein the database comprises the ~~determined~~ first and second properties of the specimen, the method further comprising calibrating the measurement device using the database.

4870. (Currently Amended) The method of claim 4809, further comprising generating a database, wherein the database comprises the ~~determined~~ first and second properties of the specimen, the method further comprising monitoring the one or more output signals of the measurement device using the database.

4871. (Currently Amended) The method of claim 4809, further comprising generating a database, wherein the database comprises the ~~determined~~ first and second properties of the specimen; and ~~wherein the database further comprises first and second properties of a plurality of specimens~~ generated using a plurality of measurement devices, the method further comprising calibrating the plurality of measurement devices using the database.

4872. (Canceled)

4873. (Currently Amended) The method of claim ~~4871~~ 4809, further comprising generating a database, wherein the database comprises the first and second properties of the specimen and wherein the first and second properties of the plurality of specimens are generated using a plurality of measurement devices, the method further comprising monitoring output signals of the plurality of measurement devices using the database.

4874. (Original) The method of claim 4809, wherein a stand alone system is coupled to the measurement device, the method further comprising calibrating the stand alone system with a calibration standard and calibrating the measurement device with the stand alone system.

4875. (Currently Amended) The method of claim 4809, wherein a stand alone system is coupled to the measurement device and at least one additional measurement device, the method further comprising calibrating the stand alone system with a calibration standard and calibrating the measurement device ~~an~~ and at least the one additional measurement device with the stand alone system.

4876. (Canceled)

4877. (Currently Amended) The method of claim 4809, further comprising altering a parameter of one or more instruments coupled to a process tool in response to at least one of the ~~determined~~ first and second properties using a feedback control technique.

4878. (Canceled)

4879. (Currently Amended) The method of claim 4809, further comprising monitoring ~~a one or more parameters~~ parameter of one or more instruments coupled to the process tool and determining a relationship between at least one of the first and second properties and at least one of the one or more parameters.

4880.-4885. (Canceled)

4886. (Original) A computer-implemented method for controlling a system configured to determine at least two properties of a specimen during use, wherein the system comprises a measurement device, the method comprising:

controlling the measurement device, wherein the measurement device comprises an illumination system and a detection system, and wherein the measurement device is coupled to a stage, comprising:

controlling the illumination system to direct energy toward a surface of the specimen;

controlling the detection system to detect energy propagating from the surface of the specimen; and

generating one or more output signals responsive to the detected energy; and

processing the one or more output signals to determine a first property and a second property of the specimen, wherein the first property comprises a presence of macro defects on the specimen, and wherein the second property comprises overlay misregistration of the specimen.

4887.-4978. (Canceled)

4979. (Original) A method for fabricating a semiconductor device, comprising:

forming a portion of the semiconductor device upon a specimen;

disposing the specimen upon a stage, wherein the stage is coupled to a measurement device, and wherein the measurement device comprises an illumination system and a detection system;

directing energy toward a surface of the specimen using the illumination system;

detecting energy propagating from the surface of the specimen using the detection system;

generating one or more output signals responsive to the detected energy; and

processing the one or more output signals to determine a first property and a second property of the specimen, wherein the first property comprises a presence of macro defects on the specimen, and wherein the second property comprises overlay misregistration of the specimen.

4980.-4995. (Canceled)

4996. (Original) A system configured to determine at least two properties of a specimen during use, comprising:

a stage configured to support the specimen during use;

a measurement device coupled to the stage, comprising:

an illumination system configured to direct energy toward a surface of the specimen during use; and

a detection system coupled to the illumination system and configured to detect energy propagating from the surface of the specimen during use, wherein the measurement device is configured to generate one or more output signals responsive to the detected energy during use;

a local processor coupled to the measurement device and configured to at least partially process the one or more output signals during use; and

a remote controller computer coupled to the local processor, wherein the remote controller computer is configured to receive the at least partially processed one or more output signals and to determine a first property and a second property of the specimen from the at least partially processed one or more output signals during use, wherein the first property comprises a presence of macro defects on the specimen, and wherein the second property comprises overlay misregistration of the specimen.

4997.-5032. (Canceled)

5033. (Currently Amended) A method for determining at least two properties of a specimen, comprising:

disposing the specimen upon a stage, wherein the stage is coupled to a measurement device, and wherein the measurement device comprises an illumination system and a detection system;

directing energy toward a surface of the specimen using the illumination system;

detecting energy propagating from the surface of the specimen using the detection system;

generating one or more output signals responsive to the detected energy; and

processing the one or more output signals to determine a first property and a second property of the specimen, wherein the first property comprises a presence of macro defects on the specimen, and wherein the second property comprises overlay misregistration of the specimen, comprising:

at least partially processing the one or more output signals using a local processor,
wherein the local processor is coupled to the measurement device;

sending the at least partially processed one or more output signals from the local
processor to a remote controller computer; and

further processing the at least partially processed one or more output signals using the
remote controller computer.

5034.-6632. (Canceled)